

ABSTRACT

Genetic relationship between different measures of feed efficiency and its component traits in Japanese Black (Wagyu) bulls

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Genetic parameters of average daily gain (ADG), metabolic body weight (MWT), body weight at finish (BWF), daily feed intake (DFI), feed conversion ratio (FCR), and residual feed intake (RFI) were estimated in 740 Japanese Black bulls. RFI was calculated as the difference between actual and expected feed intake predicted by the residual of multiple regression (RFIphe) and genetic regression (RFIgen) from the multivariate analysis for DFI, MWT, and ADG. The estimations were made for the test periods of 140 days (77 bulls) and 112 days (663 bulls). The mean for RFIphe was close to zero and RFIgen was negative. Most of the traits studied were moderately heritable (ranging from 0.24 to 0.49), except for ADG and FCR (0.20 and 0.15, respectively). The genetic correlations among growth traits (ADG, MWT and BWF) and between DFI and growth traits were high, while the phenotypic correlations between them were moderate to high. The genetic and phenotypic correlations between RFIphe and RFIgen were > 0.95 implying that they are regarded as the same trait and the genetic correlations of RFI (RFIphe and RFIgen) with FCR and DFI were favorably high. RFIphe was phenotypically independent of its component traits, MWT ($r_p = -0.01$) and ADG ($r_p = 0.01$). RFIgen was genetically independent of MWT ($r_g = -0.07$), while there was a weak genetic relationship ($r_g = 0.18$) between RFIgen and ADG. These results provide evidence that RFIgen should be included for genetic improvement of feed efficiency in Japanese Black breeding program.